

USING WEB-BASED PRACTICE ACTIVITIES TO ENHANCE AND SUPPORT PRE-SERVICE TEACHERS' LEARNING

By

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ABSTRACT

This article details two ways in which web-based practice activities were used to support instruction and enhance pre-service teachers' learning in a course on teaching reading to students with learning disabilities. First, the authors describe two performance-based assessments used to evaluate the integration of pre-service teachers' knowledge and skills with respect to professional standards. Then, it briefly summarizes two small studies that contrasted technology-enhanced practice with more traditional practice activities to support pre-service teachers' learning, - specifically progress monitoring and in teaching essential literacy skills. Finally the article discusses about how teacher preparation programs may better meet performance-based professional standards through relatively simple integration of web-based technology in course activities designed to improve pre-service teachers' knowledge and skills.

Keywords: Pre-service, Teacher Education, Teacher Preparation, Web-based Practice, Enhanced Practice, Oral Reading Fluency, Alphabetic Principle, Phonics.

INTRODUCTION

Professional standards are set by strong national and international professional organizations to ensure that preparation programs employ rigorous standards in the training of pre-service teachers (Connelly & Rosenberg, 2003). The National Council for Accreditation of Teacher Education (NCATE) oversees and establishes a rigorous set of standards to guide teacher preparation programs. NCATE revamped its entire system of standards to reflect a performance-based system. As a result of this new performance-based system, each Specialty Professional Association (SPA) for the various pre-service teacher education program areas, reorganized its standards to reflect the changes by NCATE. The Council for Exceptional Children (CEC) serves as the SPA for teacher preparation and advanced levels of teacher training related to the instruction of students with exceptional needs.

This new emphasis on performance-based outcomes of pre-service candidates represents a fundamental shift from previous standards outlined by various SPAs. Performance-based standards emphasize student

learning outcomes rather than the procedures and processes used by teacher education programs. In response, many teacher education programs developed performance-based assessments to integrate knowledge and skills across standards. Moreover, CEC highlights the new role instructional technologies play in the teaching of children, in the preparation of pre-service and current teachers, and for the advanced training of specialists.

Benefits of Instructional Technology

Teacher educators have the opportunity to use a wide variety of instructional technologies to support and enhance pre-service education courses (e.g., Web-based learning, e-learning, streamed audio, video clips, and discussion boards). Through the development and implementation of various technologies, teacher educators may realize several benefits of using instructional technology, to better prepare pre-service teachers by providing multiple opportunities for active learning in and out of the university classroom (Riccomini, 2005; Riccomini & Stecker, 2005).

The additional opportunities for active learning outside of class time as well as the continuous availability of information and practice activities may allow course instructors to make better use of their own class time. Instead of spending class time allocated to activities for developing basic skills, web-based technologies may enable pre-service teachers to acquire basic knowledge and practice skills outside of class, leaving class time for developing more advanced instructional procedures. Additionally, critical knowledge and skills may be improved through the integration of technology by developing application activities that might not otherwise be provided easily through traditional class structures.

The continued growth of instructional technologies available to teacher educators, use of instructional technology to improve the quality of teacher candidates' merits continued investigation and elaboration (O'Neal, Jones, Miller, Campbell, & Pierce, 2007; Riccomini, 2005; Riccomini & Stecker, 2005). Consequently, the purpose of this paper is to describe two ways in which web-based practice activities were used to develop basic skills needed by pre-service teachers for completing performance-based assessment activities in a course on teaching reading to children with mild disabilities.

Context

Although performance-based assessments address broad standards, specific knowledge and skills must also be developed through course instruction. Pre-service teachers are expected to practice the knowledge and skills they acquire during their coursework and complete a series of performance-based activities in conjunction with required coursework. In a required course, "Teaching Reading to Students with Mild Disabilities", knowledge and skills are integrated with respect to two performance-based activities: (a) implementation of a progress monitoring project on oral reading fluency and (b) development and delivery of an explicit instructional lesson focusing on an essential early literacy skill.

Description of Performance-Based Activities

Progress monitoring project

One of the performance-based projects involves

conducting progress monitoring with at least one student across the majority of the semester. The pre-service teacher must apply principles of curriculum-based measurement (CBM) (Deno, 2003) as the preferred method for progress monitoring in order to gauge student rate of progress and to determine whether the student is likely to meet his or her long-term goal. By comparing current rate of progress with anticipated rate of student progress at specified decision points, instructional programs are appropriately modified and improved based on the progress monitoring data. For students with Individualized Educational Plans, teachers are obligated to use ongoing formative assessment to determine throughout the year whether students appear to be on target towards meeting their annual goals and if not, to adjust instruction.

Although principles of progress monitoring may be applied to most academic areas, pre-service teachers enrolled in the reading course are expected to implement progress monitoring procedures with at least one student. One acceptable method for conducting progress monitoring in this fashion is plotting oral reading fluency data, usually twice weekly. Deno (1992) demonstrated that number of words read correctly in 1 minute has adequate reliability and validity as an overall indicator of reading performance and can be used effectively for instructional decision making using standard progress monitoring procedures. Accordingly, one basic skill that pre-service teachers must be able to perform with few errors is the collection of oral reading fluency data.

Typical instruction in this reading course includes the demonstration and collection of oral reading fluency data during class time. The instructor demonstrates the procedure, specifying rules for evaluating correct and incorrect words during the oral reading. Pre-service teachers practice while the instructor reads a premastered passage that includes specific miscues and then score each other's oral reading of selected passages. Pre-service teachers are instructed to include errors during their oral readings in order to give their examiners practice in applying scoring rules. Additional practice occurring

outside of class time requires participants to arrange to meet with each other. Preservice teachers often have reported difficulty meeting with each other due to scheduling conflicts, or, when they do meet, they fail to produce the full range of reading miscues, thereby limiting their classmates' opportunities to practice all scoring conventions.

Explicit instructional lessons

A second performance-based activity that pre-service teachers conduct during their field experience is the delivery of systematic and explicit lessons. Because these pre-service teachers deal with students who have failed to progress adequately in general education classes, course instruction focuses on the need for explicit instruction that includes clear wording for demonstration and explanation of new skills and strategies. During the reading course, preservice teachers learn about components of systematic and explicit lesson design and delivery. For that reason, these two performance-based projects enable preservice teachers to use progress monitoring data to develop individualized and explicit instructional lessons.

Course requirements specify that one of the explicit instructional lessons must target at least one objective related to an essential early literacy skill. In keeping with recommendations from the National Reading Panel (National Institute of Child Health and Human Development, 2000), explicit instruction in the area of alphabetic principle is important for early reading instruction. Preservice teachers must themselves acquire knowledge in the area of alphabetic principle in order to design and deliver effective instruction. Because knowledge in the area of alphabetic principle varies greatly among pre-service teachers enrolled in the reading course, class time is devoted to the development of basic and advanced phonics skills. Traditionally, the instructor models common letter-sound correspondences as well as common letter combinations. To help pre-service teachers acquire basic knowledge, practice activities are included across several class sessions, both with the instructor and with classmates. In this way, corrections can be made easily,

and preservice teachers can ask the instructor questions that are based on production of sounds; which is important, but very time consuming.

Problem and Potential Solution

Important prerequisite skills for successful implementation of both the progress monitoring project and explicit instructional lessons, using class time for basic practice and feedback with scoring oral reading fluency and phonics development has been problematic, as class practice activities take time away from other critical instructional priorities. Merely assigning these practice activities for students to complete during out of class time, even if done with partners, does not ensure that preservice teachers obtain the practice and corrective feedback needed to develop high levels of accuracy.

In an effort to supplement and improve the activities for this senior-level course in teaching reading, two faculty members collaborated to develop technology-enhanced practice activities for supporting preservice teachers' learning. After securing a small University grant to purchase needed equipment (e.g., video recorder and video editing software), activities were developed that could be supported through the use of technology. Specifically, we sought to use web-based technological applications for reducing in-class time devoted to basic skills development and to provide multiple opportunities for practice with feedback. A brief description of two web-based technology-enhanced activities follows.

Description of Technology-Enhanced Activities

Progress monitoring web-based practice activity

The purpose of designing this activity was to provide students with additional practice opportunities for applying standard scoring procedures when measuring oral reading fluency. Therefore, a series of audio clips of story passages read aloud by the course instructor was collected. Prior to collection of the audio clips, specific miscues were predetermined in order to provide multiple practice opportunities for each type of scoring rule. For example, several instances of substitutions, mispronunciations, reversals, and omissions were included in each passage the instructor read. The audio

clips were placed on a course Web page along with a clean copy of the story passage and a correctly scored story passage (i.e., answer key). In addition to the course Web page, a CD-ROM containing the same information as the course Web page also was available to preservice teachers. The Web page on the CD-ROM operated in exactly the same fashion as the course Web page accessed through the Internet. The CD-ROM was made available in an attempt to eliminate any problems associated with Internet access or slow connection speeds.

After receiving initial instruction during class on the utility of CBM and scoring conventions of oral reading fluency, the instructor demonstrated the procedures used to measure oral reading fluency. Then, pre-service teachers were given two opportunities to practice scoring a passage read by the instructor. All questions were clarified by the instructor after each practice opportunity. Following the in-class practice activities and questions, students were directed to access and complete the oral reading fluency practice activities available from the course Web site (Refer to Figure 1).

To complete the practice activities, pre-service teachers printed a copy of the story passage to use for scoring while listening to the audio clip. As they listened to the audio clip, they marked miscues according to scoring procedures and then compared their marked copies to the scoring keys provided on the Web page. If any discrepancies were noted, pre-service teachers were able to listen again to the audio clip to reconcile

differences. In this manner, pre-service teachers were able to complete the practice activities multiple times or until they demonstrated high levels of accuracy in scoring oral reading fluency.

Alphabetic principle web-based practice activity

The purpose of designing this activity was to provide students with a permanent and easily accessible model of each letter sound and combination, along with a corresponding keyword that embedded the targeted sound. Students could access the course Web page or CD-ROM to practice producing these sounds. Therefore, an audio clip of the instructor producing sounds for individual letters, letter combinations, and their corresponding keywords was collected. The audio clips for each sound and corresponding keyword were separated and imposed over a printed form of the letter, letter combination, and the keyword to create a Quicktime movie using basic digital editing software. For example, if the letter sound was /a/ and the keyword was "apple," the associated audio clip was placed with the letter "a" and the word "apple". The Quicktime movie file for each sound was placed on the course Web page and CD-ROM for easy access (Refer to Figure 2).

The in-class instructional procedures used in conjunction with the phonics practice activity were similar to the procedures used for the oral reading fluency practice activity. Instruction was provided by the instructor during class on the importance of phonics instruction in a reading program. Each sound was then demonstrated and students had opportunities to practice producing

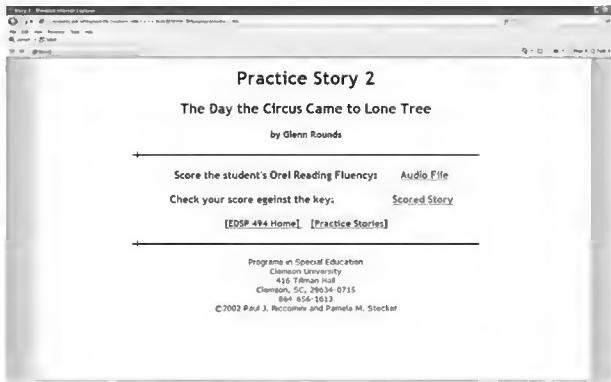


Figure 1. Screen capture of web-based progress monitoring practice activity.

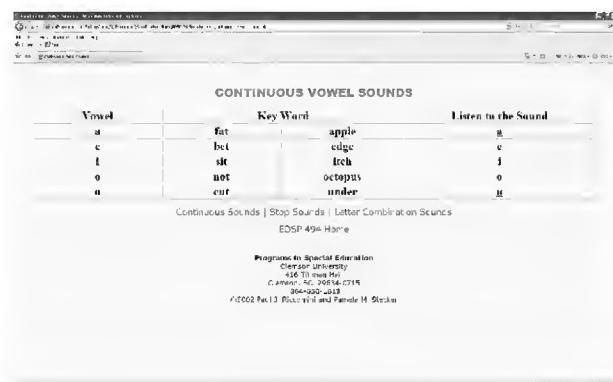


Figure 2. Screen capture of web-based alphabetic principle practice activity

saunds with the instructor and with partners. Then, students were directed to access the Quicktime movies from the course Web page in order to become more accurate and fluent in producing letter-saund carrespondences.

Evaluation of Technology-Enhanced Practice Activities

During a pilot phase, pre-service teachers completed a questionnaire and reported high levels of satisfaction with the technology-enhanced practice activities. They liked being able to practice on their own during individually convenient times with a model of correct performance being readily available. Too often, though, teacher educators adopt practices due to ease in implementation, student satisfaction, or institutional expectations without regard to systematic evaluation of outcomes. Therefore, we decided to examine the effect these technological applications had on pre-service teachers' performance.

At the beginning of the reading course, the instructor pre-tested each pre-service teacher on his / her production of common individual letter sounds, letter combinations, and application of phonics-based generalizations to nonsense words. Then, half of the students were assigned randomly to traditional practice activities during class, and the rest of the students practiced phonics with the course Web-based materials. Following post-test, everyone had access to the Web materials and CD-ROM. Although both groups of students improved from pre-test to post-test, statistically no significant differences were found in accuracy of phonics skills between the two practice conditions (Stecker & Riccamini, 2008, manuscript in preparation).

Similarly, we tested accuracy of scoring oral reading fluency in another class in which we more carefully controlled the amount of time devoted to practice activities (Riccamini & Stecker, 2005). Each pre-service teacher was assigned randomly to either a traditional practice format or to the technology-enhanced practice activity for scoring oral reading fluency. Differences in pre-test and post-test scores indicated a significant reduction in scoring discrepancies, but neither group outperformed the other.

Thus, across both studies, the use of technology-enhanced practice materials appeared to support the learning of pre-service teachers to the same extent as more traditional, in-class practice activities. These results are important for two reasons. First, the potential to reduce class time devoted to practice of basic skills was realized. Although class time was used to instruct pre-service teachers in the navigation of the Web-based activities, repeated practice during class time for acquisition of phonics knowledge and scoring of oral reading fluency was not needed. Second, the use of these particular technology-enhanced activities provided pre-service teachers with an avenue for practicing basic skills independently while still providing a built-in model for comparison. Therefore, we were able to satisfy both of our objectives, - reduce class time devoted to practice of basic skills and provide a means for aiding pre-service teachers to achieve accuracy independent of an in-class model. However, our technology-enhanced practice activities did not emerge as superior to traditional practice. We merely showed that the technology-enhanced activities appeared to support learning in ways similar to traditional practice conducted during class time. Further investigation may demonstrate additional ways in which technology-enhanced activities could support pre-service teachers' learning. For example, with regard to these two activities the study outlined, it could include audio clips of real students reading passages, thereby providing authenticity to practice activities. Phonics activities could show video clips of mouth formations, thereby aiding pre-service teachers in watching sounds being produced rather than just hearing them, when letter or letters are selected. Consequently, several straightforward changes in presentation could ultimately demonstrate an advantage for individuals using instructional technology for practice activities over more traditional forms of practice.

Discussion

Teacher preparation programs may better meet professional standards through relatively simple integration of technology in course activities designed to support pre-service teachers' knowledge and skills. In

addition to addressing CEC's changing emphasis on the use of technological applications in higher education and in the direct service delivery of literacy instruction in PK-12, activities utilizing technology have great potential for improving instructional practices. As more advanced technologies become increasingly available, pre-service teacher educators face multiple possibilities for enhancing their instructional practices. However, our collaboration illustrated that technological applications did not have to be dramatic in order to address instructional needs effectively. A logical first step is for teacher educators to examine their current instructional practices. One may examine different ways in which technology can enhance already established course activities. Most Institutions of Higher Education have established instructional technology support and, in some cases, entire departments were responsible for assisting faculty with the integration of technology into their courses. When these resources are available, teacher educators can take advantage of the expertise available and begin to enhance their instructional practices using technological applications.

As illustrated in our examples, two particular benefits in using technology-enhanced activities included less class time devoted to practice exercises and the continuous availability of practice activities for preservice teachers that incorporated a correct model for comparison. Both benefits have the potential to help teacher preparation programs better meet professional standards: Teacher educators may reallocate more class time to advanced knowledge and skills applications when preservice teachers are able to access basic practice activities outside of class time without compromising their overall performance. The caveat is that teacher educators also must be diligent in systematically examining the effects of instructional technology on candidate performance.

Conclusion

This article detailed two ways in which web-based practice activities were used to support instruction and enhance preservice teachers' learning. The findings in this application of technology enhanced practice activities indicate that technology enhanced and traditional

practice activities resulted in similar improvements in performance and acceptance by preservice teachers completing special education coursework. As preservice programs begin to incorporate more technology applications for instructional and practice purposes, the overall effectiveness of these technologies must be continually examined and evaluated for effectiveness. Although results of this project can potentially contribute to the application of technology enhanced practice activities with preservice special education teachers, further research is needed. With continued research in the effective use of technology enhanced practice activities, educators can continue to improve their preservice education programs through the use of technology.

References

- [1]. Connelly, V. J., & Rosenberg, M. S. (2003). *Developing teaching as a profession: Comparison with careers that have achieved full professional standing*. (COPSSE Document No. RS-9). Gainesville: University of Florida, Center on Personnel Studies in Special Education.
- [2]. Council for Exceptional Children. (2003). *What every special educator must know: Ethics, standards, and guidelines for special educators* (5th ed.). Upper Saddle River, NJ: Pearson.
- [3]. Deno, S. L. (1992). The nature and development of curriculum-based measurement. *Preventing School Failure*, 36 (2), 5-10.
- [4]. Deno, S. L. (2003). Developments in curriculum-based measurement. *The Journal of Special Education*, 37, 184-192.
- [5]. National Institute of Child Health and Human Development (2000). *Report of the National Reading Panel. Teaching children to read: An evidence-based assessment of the scientific research literature on reading and its implications for reading instruction: Reports of the subgroups* (NIH Publication No. 00-4754). Washington, DC: U.S. Government Printing Office.
- [6]. O'Neal, K., Jones, W. P., Miller, S. P., Campbell, P., & Pierce, T. (2007). Comparing web-based to traditional instruction for teaching special education content. *Teacher Education and Special Education* 30(1), 24-41.

- [7]. Riccomini, P. J. (2005). Identification and remediation of systematic error patterns in subtraction. *Learning Disability Quarterly, 28*(3), 1-10.
- [8]. Riccomini, P. J., & Stecker, P. M. (2005). Effects of technology-enhanced practice on scoring accuracy of oral reading fluency. *Journal of Special Education Technology, 20*(3), 5-12.
- [9]. Stecker, P. M., & Riccomini, P. J. (2008, manuscript in preparation). *The use of technology-enhanced practice activities to support preservice teachers' phonics knowledge and application.*

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